

WEIL-McLAIN

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VHE (Series 3) Gas-Fired, Induced Draft

Boiler Manual



- Includes:**
- Installation
 - Start-up
 - Service
 - Parts

**Refer to Control Supplement
for additional information**

BOILER MANUAL FOR USE BY A CERTIFIED VHE HEATING SPECIALIST

- | | |
|--------------------------|--|
| To the owner: | Regular service on this boiler is recommended and should be performed by a certified VHE heating specialist. |
| To the installer: | Read all instructions and warranty before starting.
Refer to vent section before locating exhaust. |

Any claims for damage or shortage in shipment must be filed immediately against the transportation company by the consignee.

Table of Contents

Section I: Pre-Installation

Life of Heating Systems	3
Air Supply for Combustion	4
Minimum Clearances	4
Foundation	4

Section II: Boiler Set-Up

Placing the Boiler	5
Orifice Size	5
Hydrostatic Pressure Test	5

Section III: Piping

Single Zone	6
Multiple Zones with Zone Valves	6
Expansion Tank Sizing	7
Multiple Zones with Circulators	7
Use with Refrigeration System	8
By-Pass Piping	8

Section IV: Venting

Special Requirements	9
Direct Exhaust Through Wall	10
Existing Chimney	11

Section V: Gas Piping 12-13

Section VI: Wiring 13

Section VII: Final Adjustments

Water Treatment	14
Freeze Protection	14
Fill the System	14
To Place in Operation	14

Section VIII: Check-Out Procedure 15

Section IX: Maintenance 16-17

Section X: Replacement Parts 17-22

Ratings & Dimensions 23

IMPORTANT: When calling or writing about the boiler, PLEASE GIVE THE MODEL, SERIES, AND C.P. NUMBER located on the boiler rating plate.

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WARNING

**DO NOT USE PETROLEUM-BASED CLEANING OR SEALING COMPOUNDS IN BOILER SYSTEM.
SEVERE DAMAGE TO THE BOILER WILL OCCUR.**

The following defined terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning the life of the product.

DANGER

indicates presence of a hazard which *will* cause *severe* personal injury, death or substantial property damage if ignored.

CAUTION

indicates presence of a hazard which *will* or *can* cause minor personal injury or property damage if ignored.

WARNING

indicates presence of a hazard which *can* cause *severe* personal injury, death or substantial property damage if ignored.

NOTICE

indicates special instructions on installations, operation, or maintenance which are important but not related to personal injury hazards.

WARNING

FAILURE TO FOLLOW ALL INSTRUCTIONS IN PROPER ORDER CAN CAUSE PERSONAL INJURY OR DEATH. READ ALL INSTRUCTIONS BEFORE INSTALLING.

Section I: Pre-Installation

CODES

Installations must comply with all local codes, laws, regulations and ordinances, also United States National Fuel Gas Code ANSI Z223.1-1984. When required, installations must conform to American Society of Mechanical Engineers Safety Code for Controls and Safety Devices for Automatically Fired Boilers, No. CSD-1. Safe lighting and other performance criteria were met with the gas manifold and control assembly provided on boiler when boiler underwent tests specified in the ANSI Z21.13-1984 standard.

LIFE OF HEATING SYSTEMS IN CONTAMINATED ATMOSPHERES

The gas fired appliance industry has a history of corrosion of flue pipe and other equipment parts because of installation in chemically contaminated environments. Historically, even conventional products had shorter than average life in severely contaminated areas such as:

Dry Cleaning Establishments
Metal Fabricating Plants
Beauty Shops
Refrigeration Repair Shops
Photo Processing Plants
Auto Body Shops
Plastic Manufacturing Plants
Furniture Refinishing Operations
New Building Construction
Remodeling Areas

Newer gas fired products are designed to lower flue gas temperature to condensing levels to achieve higher efficiencies. This causes shorter life because contaminants in the combustion air, when passed through the burner, become hydrochloric and hydrofluoric acids. These acids in the flue gas, combining with the condensate, can attack even stainless steel used in high efficiency condensing systems.

Boiler warranty does not cover damage to boilers or venting systems caused by combustion air contaminated externally by chemical vapors.

Therefore, it is essential that you avoid installing high efficiency gas fired condensing appliances like the VHE in locations that have processes or store chemicals such as:

1. Contents of **spray cans** which contain chlorides and/or fluorides in their formulation.
2. **Permanent wave** solutions.
3. **Chlorinated waxes and cleaners.**
4. **Chlorine based swimming pool chemicals.**
5. Calcium chloride used for thawing and **sodium chloride** used for water softening.
6. **Refrigerant leaks.**
7. **Paint or varnish removers.**
8. **Hydrochloric acid/muriatic acid.**
9. **Cements and glues.**
10. **Adhesives** used in fastening building products.
11. Anti-static **fabric softeners** used in clothes dryers.
12. Chloride type household **bleaches, detergents and cleaning solvents.**
13. ... and other similar chemicals.

WARNING

LOOK FOR ANY OF THE ABOVE SUBSTANCES BEING USED OR STORED IN THE SPACE FROM WHICH COMBUSTION AIR IS DRAWN BEFORE INSTALLING THE VHE BOILER.

SOLUTIONS:

- 1) REMOVE CHEMICALS
OR
- 2) PROVIDE OUTSIDE AIR FOR COMBUSTION
OR
- 3) USE NON-CONDENSING PRODUCTS SUCH AS THE HE, P-CG, ETC.

VENTING

WARNING

GIVE SPECIAL ATTENTION TO LOCATION OF VENT TO AVOID POSSIBILITY OF PROPERTY DAMAGE OR PERSONAL INJURY.

1. Gases will form a white plume in winter.
2. Prevailing winds could cause freezing of condensate and water/ice build-up on building, plants or roof.
3. Plume could obstruct favorite window view.
4. Locate or guard the vent to prevent accidental contact by people or pets.
5. Vent must terminate at least 4 feet below, 4 feet horizontally from, or 1 foot above any door, window or gravity air inlet to the building. This vent must not be less than 7 feet above grade when located adjacent to public walkways.
6. DO NOT terminate vent in window well, stairwell, alcove, courtyard or other recessed area.

AIR SUPPLY FOR COMBUSTION

WARNING

Adequate combustion and ventilation air must be provided to assure proper combustion and prevent the possibility of flue gas spillage.

1. In buildings of conventional frame, masonry or metal construction, infiltration is normally adequate to provide combustion air for boilers in unconfined rooms.
2. If the space is in a building of unusually tight construction, air should be obtained from outdoors or from spaces which freely connect with outdoors (see #4 below).
3. For boilers in confined rooms, two permanent openings shall be provided; one within 12 inches from the ceiling and one within 12 inches from the floor of the room. Each opening shall be at least one square inch per 1,000 BTUH boiler input, but must not be less than 100 sq. inches. These openings shall freely connect with areas having adequate infiltration from outside.
4. When all air is provided from outdoors the confined space shall be provided with two openings as outlined above. These openings shall connect directly or by ducts with outdoors or spaces (crawl or attic) that freely connect with the outdoors and shall be of the size listed below for that particular arrangement:
 - (a) One square inch per 4,000 BTUH of boiler input for direct outdoor air supply through an outside wall or through vertical ducting directly to outside.
 - (b) One square inch per 2,000 BTUH of boiler input for direct outdoor air through horizontal ducting.
 - (c) All ducting shall be of the same size as the opening to which it is connected with minimum dimensions of no less than 3 x 3 inches or 9 total square inches of area.
 - (d) Other size ducting must comply with local codes.

MINIMUM SERVICE CLEARANCES

Suggested for easy servicing:

24 inches for cleaning and servicing, left side.
18 inches for access to controls and components, front.
36 inches from top for cleaning flueways.
6 inches on remaining sides.

Screwdriver clearance for removal of jacket screws should be provided. If not, unions and shut-off valves should be installed in system so boiler can be moved for servicing.

MINIMUM CLEARANCE FOR CLOSET INSTALLATIONS

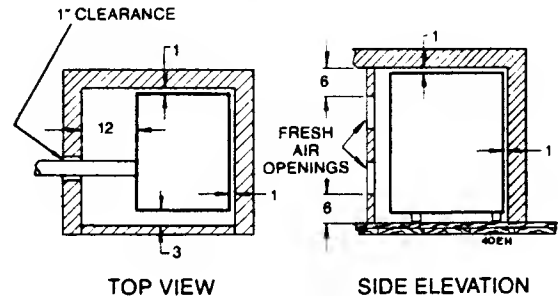


FIGURE 1

RESIDENTIAL GARAGE INSTALLATION (ANSI Z223.1)

Install boiler so burners are at least 18 inches above the floor.

FOUNDATION

VHE boilers are approved for use on combustible flooring but **MUST NOT BE INSTALLED ON CARPETING.**

1. Level concrete or solid brick pad foundation is required if:
 - a) There is a possibility of the floor becoming flooded;
 - b) Non-level conditions exist.

MINIMUM BOILER FOUNDATION SIZES	
Number of Boiler Sections	Foundation Width "W"
3	12"
4	15"
5	18"
6	21"

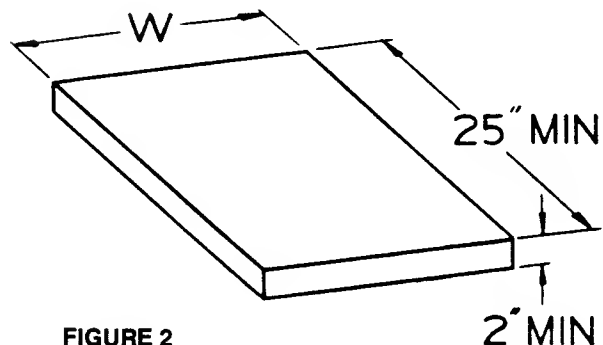


FIGURE 2

Section II: Boiler Set-up

PLACING THE BOILER

Leave boiler in crate and on pallet until installation site is ready.

1. Move entire crate and pallet next to selected location.
2. Remove crate.
3. Remove boiler from pallet as follows:
 - a. Tilt left side of boiler up and place a board under left legs.
 - b. Tilt boiler the other way and place a board under right legs.
 - c. Slide boiler backward off pallet and into position.

DO NOT DROP BOILER OR BUMP JACKET ON FLOOR OR PALLET.

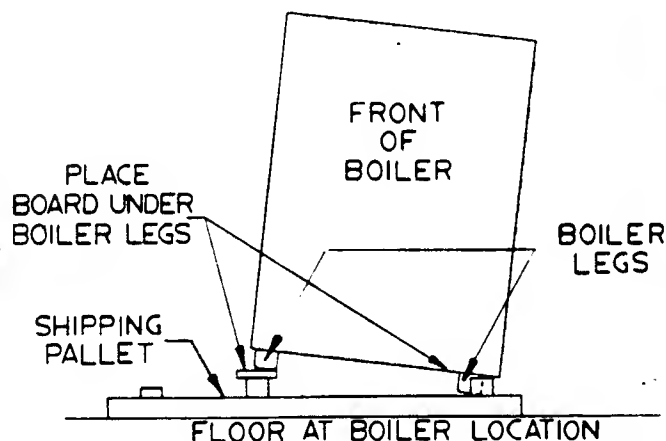
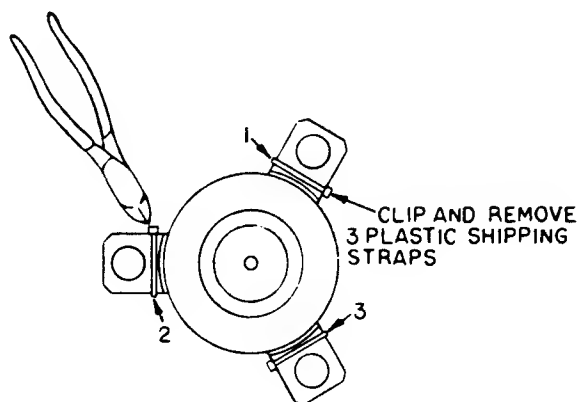


FIGURE 3

4. Check level. Shim legs, if needed. Do not alter the legs.
5. Remove blower shipping plastic straps.



**SHIPPING STRAP REMOVAL
FIGURE 4**

6. Check for proper orifice sizing from chart below.

ORIFICE DRILL SIZES		
Type of Gas	Heating Value, BTU/cu. ft.	Std. Orifice Drill Size
Natural	1000	47
Propane	2500	56

7. Check burner tubes for placement in their slots at the back with openings up. Make sure gas orifices inject down center of burner tubes.
8. Replace burner access panel and jacket door.

CAUTION

Access panel must be secured in position during boiler operation to prevent momentary flame rollout on ignition of main flame, which can melt thermal fuse element.

DANGER

NEVER JUMPER THERMAL FUSE OR A HAZARDOUS CONDITION WILL EXIST.

HYDROSTATIC PRESSURE TEST

Pressure test before attaching piping or electrical supply.

CAUTION

Leaks must be repaired at once or damage to the boiler can result. **NEVER** use petroleum based stop-leak compounds or leakage between the sections will occur.

1. Remove shipping nipple from supply outlet. Plug tapings, including compression tank tapping.
2. Connect water supply. Fill boiler and purge all air. **TEST AT 45 PSIG for more than 10 minutes.**

WARNING

Do not leave the boiler unattended. A cold water fill could expand and cause excessive pressure.

3. Make sure gauge pressure has been maintained.
4. Check for leaks. Repair, if found.
5. Drain boiler and remove testing plugs.
6. On initial start-up, check for leaks in system piping. If found, repair at once.

Section III: Piping

CAUTION

Failure to properly pipe boiler may result in improper operation and damage to boiler or building.

RECOMMENDED BOILER AND SYSTEM PIPING FOR SINGLE ZONE (OR MULTIPLE ZONES WITH ZONE VALVES)

1. Pipe as shown in Figures 5 or 6.

2. Use low water cut-off when:

- boiler is located above radiation level.
- required by certain state, local, or territorial codes or insurance companies.

Use low water cut-off designed for water installations. Electrode probe type is recommended. Install in tee in supply piping.

3. If the system is to comply with ASME codes, an additional high temperature limit is needed. Purchase and install in supply piping from the boiler.

4.

WARNING

Relief valve discharge piping must be piped near floor close to floor drain to eliminate potential of severe burns. Do not pipe to any area where freezing could occur.

5. Expansion tank and air vent:

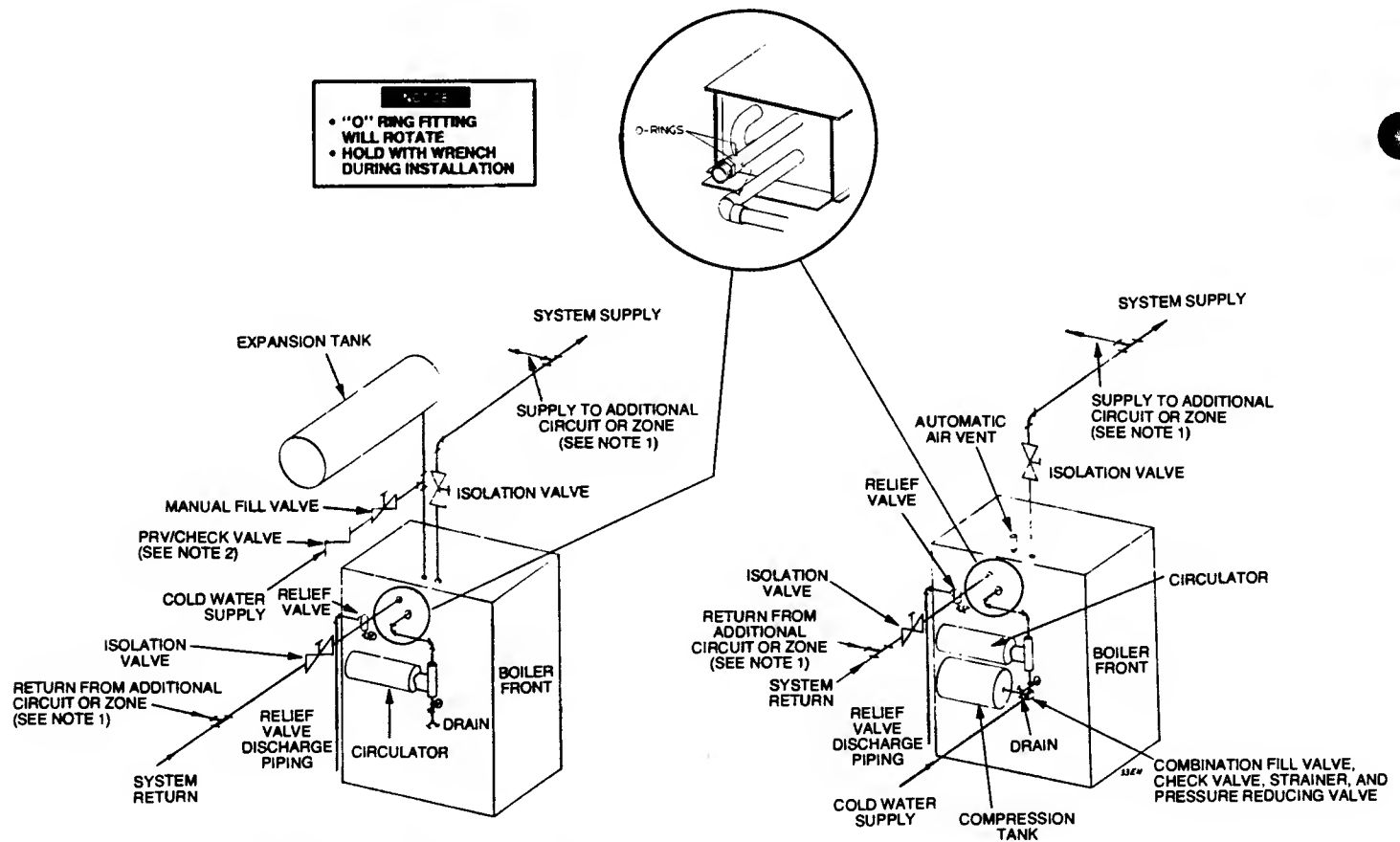
a. For P-VHE boilers—

1) Pre-pressurized expansion tank is provided. Ensure tank pressure and size will handle system fill and water volume.

a) Fill pressure may be adjusted at tank for design conditions. Follow manufacturer's instructions.

b) Additional tanks may be connected to tees in system near boiler. See Table I.

2) Install provided air vent.



NOTES:

1. Use balancing valves or zone valves in each circuit for multiple circuit applications.
2. Use backflow check valve where required by local codes.

NOTES:

1. Use balancing valves or zone valves in each circuit for multiple circuit applications.

VHE BOILERS
FIGURE 5

P-VHE BOILERS
FIGURE 6

b) For VHE boilers—

- 1) Size tank to system requirements. Refer to tank manufacturer's instructions and Table I.
- 2) Closed diaphragm pre-pressurized tank—locate near boiler.

NOTICE

Install manual or automatic air vent in $\frac{1}{2}$ " tapping as shown in Figure 6 when using closed diaphragm pre-pressurized tank.

- 3) Closed type tank—connect from $\frac{1}{2}$ " tapping (located behind supply outlet) to expansion tank. Use $\frac{1}{2}$ " NPT piping. Any horizontal piping must pitch up towards tank 1" per 5 feet of piping.
- 4) Built-in air elimination system is provided. No additional device is needed if tank is piped as shown in Figure 5.

6. Connect supply, return, and cold water fill piping as shown in Figures 5 or 6.

CAUTION

Care must be taken when attaching system return to boiler. Use wrench to support copper fitting.

TABLE I—EXPANSION TANK SIZING*

Number of Boiler Sections	Standard Fill-Trol Tank—Adequate for Series Loop Piping Systems with Convactor Baseboard	Additional Ex-Trol Tank Required for One Pipe Systems with Convactor Baseboard	** Additional Ex-Trol Tank(s) Required for Cast-Iron Radiators	Additional Ex-Trol Tank(s) Required for Cast-Iron Baseboard
3	No. 109•	—	No. 15	No. 15
4	No. 109•	No. 15	No. 15	No. 30
5	No. 109•	No. 15	No. 15	No. 30
6	No. 110•	—	No. 15	No. 30

- * Tank selections based on 220°F. average system water temperature.
- Standard equipment for P-VHE boilers.
- ** Systems with unusually large volumes of water may require additional expansion capacity.

MULTIPLE ZONING WITH CIRCULATORS

1. If multiple zoning with circulators, boiler must be repiped. See Figure 7.

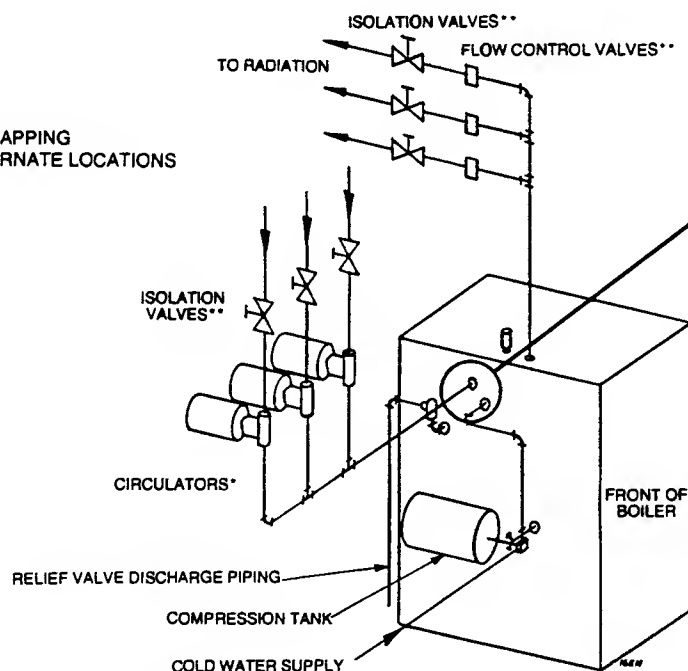
- a) Remove provided circulator.
- b) Replace circulator with pipe.

NOTICE

Care must be taken when soldering to not overheat the O-ring in the heat exchanger connection. Overheating will deteriorate the O-ring and cause leakage.

- c) Determine if by-pass piping will be needed. See page 8.
- d) Mount circulators as shown.
- e) Install flow control valves.
- f) Follow remaining piping instructions.

*DO NOT USE DRAIN COCK TAPPING
**MAY BE INSTALLED IN ALTERNATE LOCATIONS



NOTE

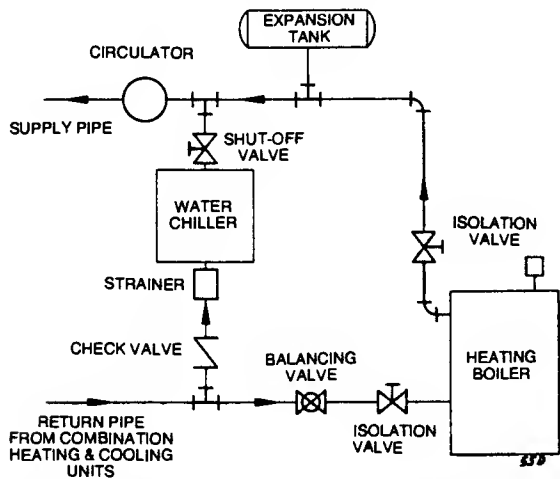
- "O" RING FITTING WILL ROTATE
- HOLD WITH WRENCH DURING INSTALLATION

IMPORTANT: REMOVE PROVIDED CIRCULATOR AND REPLACE WITH PIPE

TYPICAL VHE
MULTICIRCULATOR-ZONING
FIGURE 7

USE WITH REFRIGERATION SYSTEM

The boiler must be installed so that chilled medium is piped in parallel with the heating boiler with appropriate valves to prevent the chilled medium from entering the boiler. Consult I=B=R Installation and Piping Guides.



RECOMMENDED PIPING FOR COMBINATION HEATING & COOLING (REFRIGERATION) SYSTEMS
FIGURE 8

BYPASS PIPING

BYPASS PIPING IS NOT NORMALLY REQUIRED ON ANY BASEBOARD SYSTEM.

Bypass, supply, and return piping should be same size.

1. To protect system radiant panels, plaster, etc. from high temperature water supplied from boiler, see Figure 9.

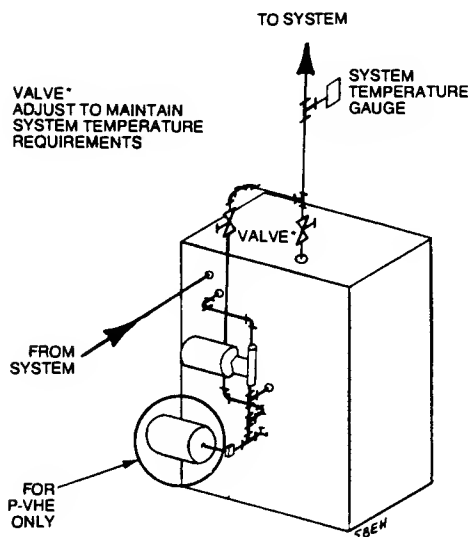


FIGURE 9

2. To protect boiler from condensation formed by low temperature water returned from large water content converted gravity systems, etc., see Figure 10.

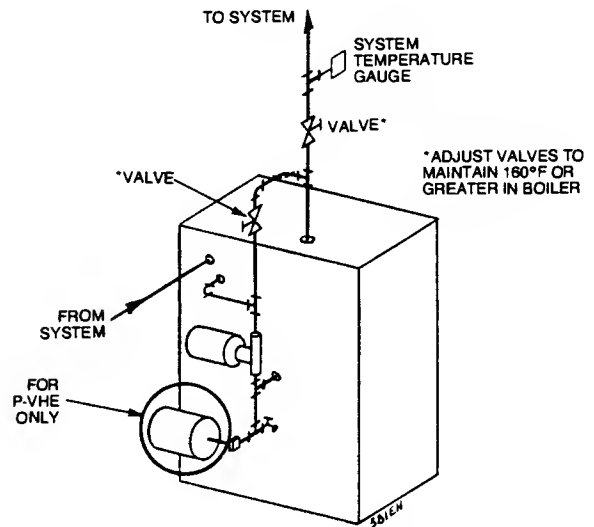


FIGURE 10

3. To protect boiler from condensation while protecting system from high temperature water, as in large water content radiant ceiling panels, see Figure 11.

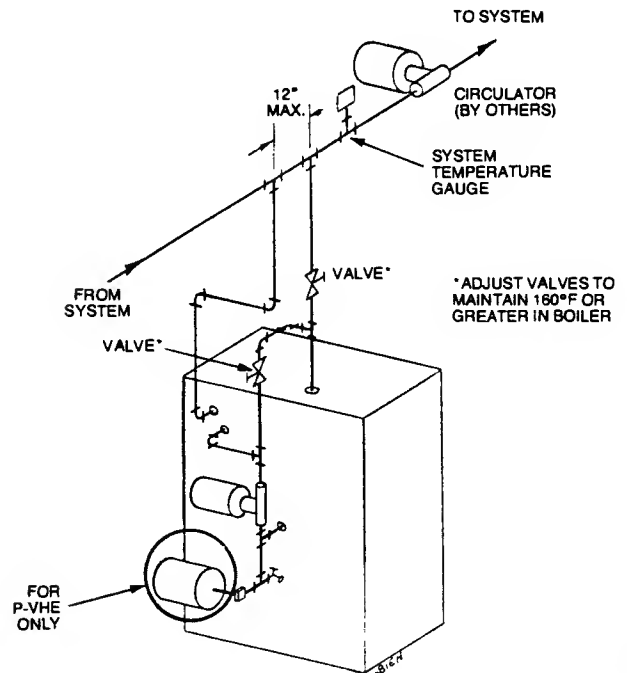


FIGURE 11

Section IV: Venting

SPECIAL REQUIREMENTS

1. 3 inch diameter type 304 or 316 or AL 294C stainless steel vent pipe must be used.
2. DO NOT connect any other appliance to this vent or connect multiple VHE boilers to a common vent.
3. Crimped ends of flue pipe must point toward boiler for good condensate drain back to vent ell at boiler.
4. Do not install seams of vent pipe on bottom of runs.
5. Seal all joints with approved silicone sealant.

VENTING PROCEDURE

1. Determine whether to vent with the direct exhaust method through the wall or through existing chimney as raceway.

CAUTION

When removing existing appliance from common venting system, vent system may be too large for remaining appliance. Improper venting could result. Consult gas supplier for proper vent sizing.

2. Determine entire vent length and number of elbows required. Actual venting system must not exceed limitations in charts.

MAXIMUM VENTING SYSTEM LENGTH VS. NUMBER OF ELBOWS—VHE 3-5

Maximum Venting System Length—Feet	48	41	34	27	20
Maximum Number of Elbows	2	3	4	5	6

MAXIMUM VENTING SYSTEM LENGTH VS. NUMBER OF ELBOWS—VHE 6

Maximum Venting System Length—Feet	38	31	25	18	14
Maximum Number of Elbows	2	3	4	5	6

MAXIMUM VENTING SYSTEM LENGTH VS. NUMBER OF ELBOWS STAINLESS STEEL FLEXIBLE VENT—3"

Maximum Venting System Length—Feet	48	38	31	24	17
Maximum Number of Elbows	0	1	2	3	4

3. Install plastic vent ell. See Figure 12.

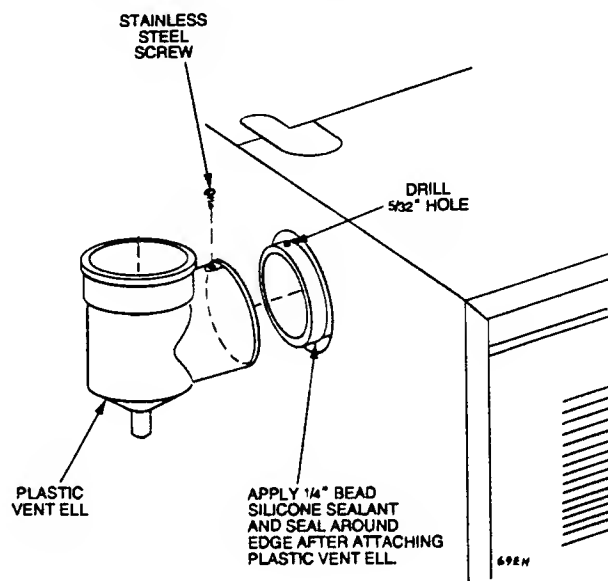


FIGURE 12

4. Install plastic drain trap and tubing. See Figure 13.

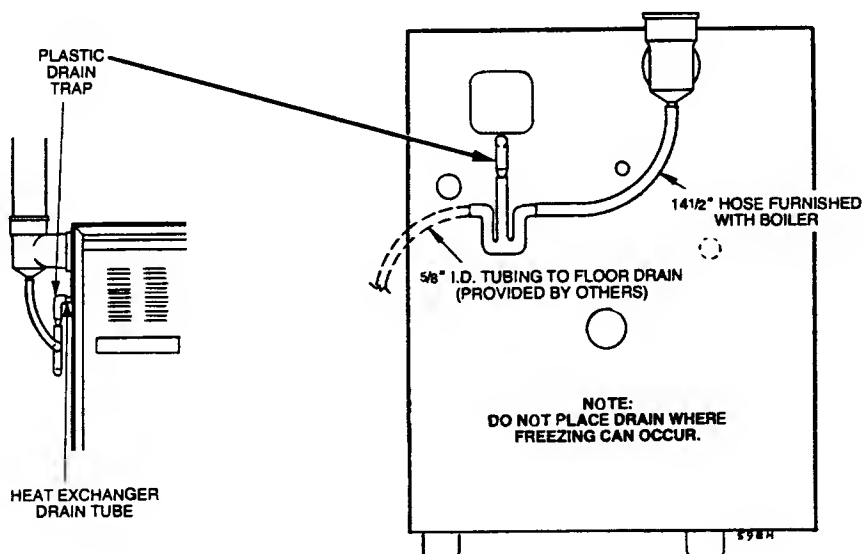
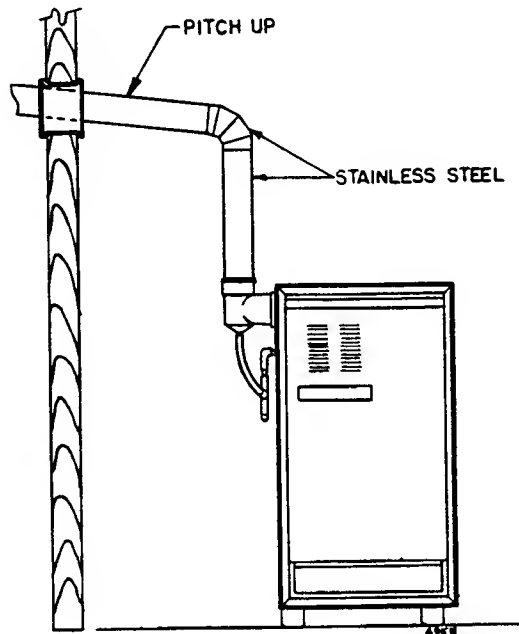


FIGURE 13

DIRECT EXHAUST THROUGH THE WALL

1. All special requirements listed on page 9 must be followed.
2. Terminate on a wall away from prevailing winds to prevent icing.
3. Terminate at least 6 feet away from adjacent walls.
4. Do not terminate over a window well, stairwell, alcove, courtyard or other recessed area.

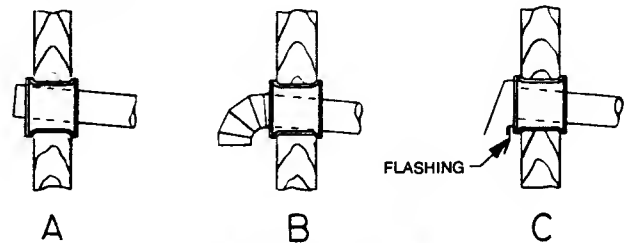


**HORIZONTAL VENTING WITH VERTICAL RISER
FIGURE 14**

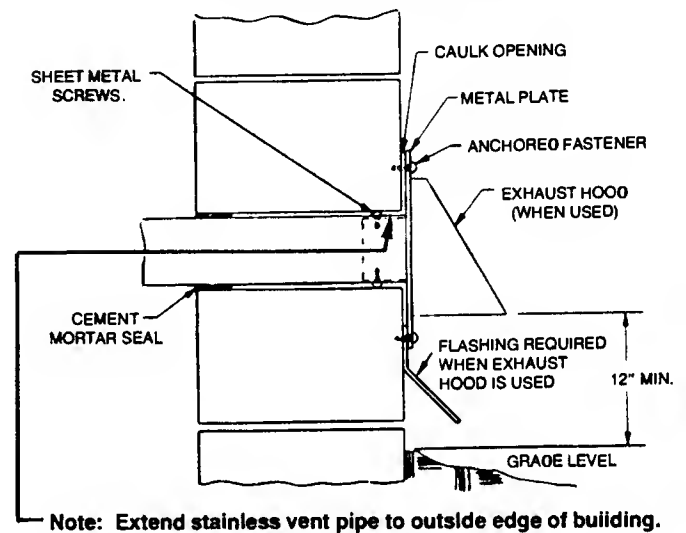
5. MAINTAIN ONE INCH CLEARANCE from combustible materials to vent pipe.
6. Do not store sources of contaminating chemicals in area where the boiler is located. Refer to page 3, Life of Heating Systems in Contaminated Atmospheres.
7. Long horizontal vent runs should be supported with appropriate hangers.
8. Vent termination (Figure 15):
 - a. In masonry walls make a 3½ to 4-inch diameter hole. Follow Figure 16.
 - b. Combustible material will require a 5-inch hole. Make a sheet metal plate with a 3-inch hole to cover the opening. Follow Figure 17.
 - c. Terminate above normal snowline.

9. Acceptable method for direct exhaust:

- a. Remove basement windowpane, if not in a window well, and replace with sheet metal plate with 3-inch hole.

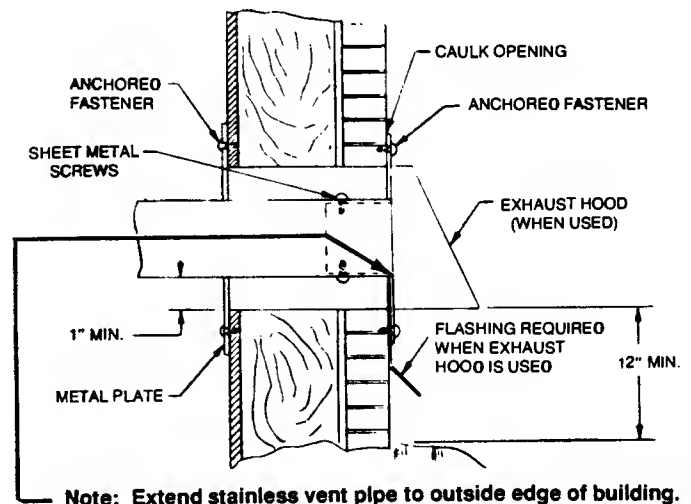


**DIRECT EXHAUST VENT TERMINATION
FIGURE 15**



Note: Extend stainless vent pipe to outside edge of building.

**HORIZONTAL VENTING
NON-COMBUSTIBLE WALL
FIGURE 16**



Note: Extend stainless vent pipe to outside edge of building.

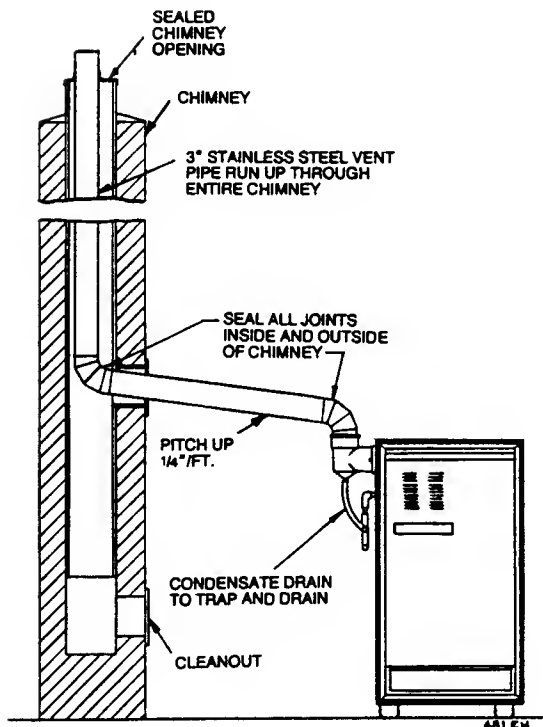
**HORIZONTAL VENTING
COMBUSTIBLE WALL
FIGURE 17**

DIRECT EXHAUST THROUGH EXISTING CHIMNEY

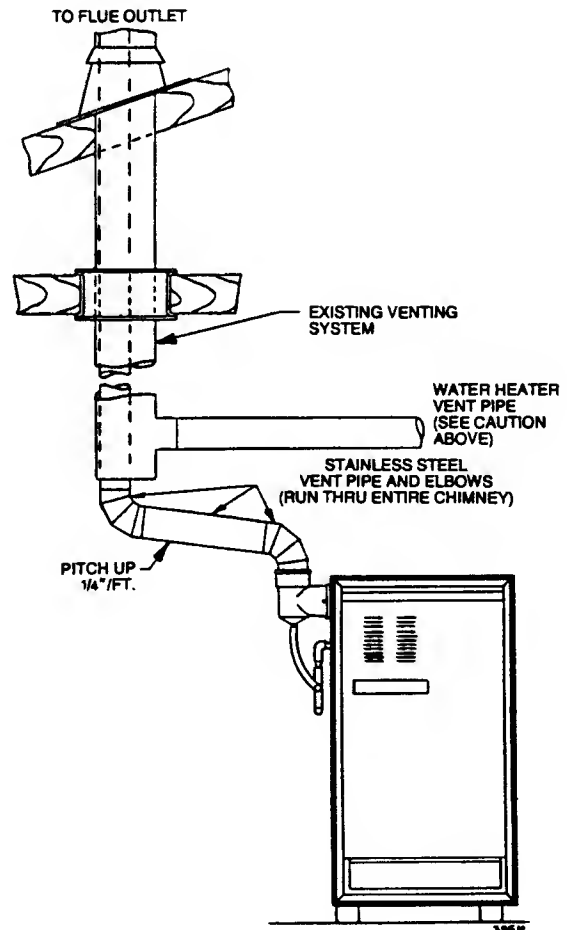
CAUTION

When removing existing appliance from common venting system, vent system may be too large for remaining appliance. Improper venting could result. Consult gas supplier for proper vent sizing.

1. All special requirements listed on page 9 must be followed.
2. Stainless steel vent pipe must extend through the entire length of the existing chimney.
3. Vent piping must be supported at bottom and top.
4. **MAINTAIN ONE INCH CLEARANCE** from combustible materials to vent pipe.
5. Long horizontal vent runs should be supported with appropriate hangers.
6. Do not store sources of contaminating chemicals in area where boiler is located. Refer to page 3, Life of Heating Systems in Contaminated Atmospheres.



VENTING THROUGH CHIMNEY
FIGURE 18



COMMON VENTING
THROUGH EXISTING CHIMNEY
FIGURE 19

Section V: Gas Piping

Size gas piping considering:

- Diameter and length of gas supply piping.
 - Number of fittings.
 - Maximum gas consumption (including any possible future expansion).
 - Allowable loss in gas pressure from gas meter outlet to boiler. This is specified as three-tenths of an inch water column. For additional pressure drops, see ANSI Z223.1
- For natural gas:
 - Refer to following tables. To obtain cubic feet per hour, divide the input by 1000.
 - Size for rated boiler input.
 - Inlet gas pressure: 5" W.C. minimum
13" W.C. maximum
 - Manifold gas pressure: $3\frac{1}{2}$ " W.C.
 - Install 100% lock-up gas pressure regulator in supply line if inlet pressure exceeds 13" W.C. Adjust for 13" W.C. maximum.
 - For propane gas:
 - Inlet gas pressure: 11" W.C. minimum
13" W.C. maximum
 - Manifold gas pressure: 10" W.C.
 - Gas pressure regulator provided by gas supplier must be adjusted for maximum pressure of 13" W.C.
 - Contact gas supplier to size pipes, tanks and regulator.
 - Remove jacket door and refer to Figure 20 for gas piping.

PIPE DELIVERY SCHEDULE

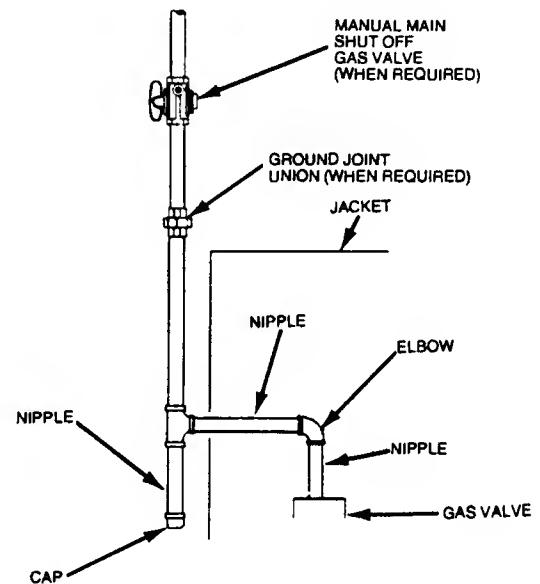
Length of Pipe In Feet	*CAPACITY OF PIPE IN CUBIC FEET OF GAS PER HOUR				
	$\frac{1}{2}$ "	$\frac{3}{4}$ "	1"	$1\frac{1}{4}$ "	$1\frac{1}{2}$ "
10	132	278	520	1050	1600
20	92	190	350	730	1100
30	73	152	285	590	890
40	63	130	245	500	760
50	56	115	215	440	670
75	45	93	175	360	545
100	38	79	150	305	460
150	31	64	120	250	380

* Flow determined by Dr. Pole's Formula—0.60 Specific Gravity, 0.30 inches water column pressure drop.

NOTE: For additional piping schedules, see ANSI Z223.1

ADDITIONAL LENGTH OF PIPE TO BE ADDED FOR EACH ELBOW OR TEE BEND IN THE LINE

Pipe Size, Inches	Additional Length, Feet
$\frac{1}{2}$	1.3
$\frac{3}{4}$	1.7
1	2.2
$1\frac{1}{4}$	2.9
$1\frac{1}{2}$	3.3



**GAS SUPPLY PIPING
FIGURE 20**

- Follow good piping practices.
- Pipe joint compound (pipe dope) must be resistant to corrosive action of liquified petroleum gases and applied sparingly only to male threads of pipe joints.
- Install drip leg at inlet of gas connection to boiler. Where local utility requires drip leg be extended to the floor, use an appropriate length of pipe between the cap and tee.
- Install ground joint union to provide for servicing, when required.
- Install manual shut-off valve in gas supply piping outside boiler jacket when required by local codes or utility requirements.

9. Support piping by hangers, not by the boiler or its accessories.
10. Purge all air from supply piping.
11. Check factory installed piping and field installed piping for leaks—BUBBLE TEST.

CAUTION

- a) **DO NOT** check for gas leaks with an open flame—BUBBLE TEST.
- b) Close manual main shut-off valve during any pressure testing at less than 13 inches water column.
- c) Disconnect boiler and gas valve from gas supply piping during any pressure test greater than 13 inches water column.

Section VI: Wiring

Refer to wiring diagram label on jacket door and Control Supplement for specific wiring information.

WIRING

WARNING

For your safety, turn off electrical power supply at service entrance panel before making any electrical connections to avoid possible electrical shock hazard.

All wiring must be installed in accordance with requirements of the National Electrical Code and any additional national, state, or local code requirements having jurisdiction. All safety circuit wiring must be N.E.C. Class 1.

The boiler must be electrically grounded in accordance with the National Electrical Code, ANSI/NFPA No. 70-1984. Use 90°C Thermoplastic Wire, or equivalent, if any original wire must be replaced.

The boiler is shipped with the control components completely wired.

A separate electrical circuit should be used for the boiler with a fused disconnect switch (15 amp. recommended). Bring electrical supply through proper opening in jacket left end panel and into electrical junction box. Wire electrical supply to leads in junction box as shown on the diagram.

INSTALL ROOM THERMOSTAT

Install room thermostat on an inside wall. Never install where it will be influenced by drafts, hot or cold water pipes, lighting fixtures, television, sun rays or near a fireplace.

Heat anticipator in thermostat must be set to match power requirements of primary control to which it is connected.

Refer to wiring diagram on jacket door or in Control Supplement for recommended heat anticipator setting with standard equipment. Wire thermostat as shown.

Section VII: Final Adjustments

WATER TREATMENT

Never use petroleum based stop-leak compounds. Water seal deterioration will occur, resulting in leakage between sections.

Continual fresh make-up water will reduce boiler life. Minerals can build up in the sections, reducing heat transfer, overheating the cast iron, and causing section failure.

For unusually hard water areas or low pH water conditions (below 7.0) consult local water treatment company.

Freeze protection (when used):

Use antifreeze especially made for hydronic systems. Inhibited propylene glycol is recommended. **DO NOT** use undiluted or automotive type antifreeze.

50% solution provides maximum protection to about -30°F . Local codes may require a back-flow preventer or actual disconnect from city water supply.

Determine quantity according to system water content. Boiler water content is listed on page 23.

Follow antifreeze manufacturer's instructions.

FILL THE SYSTEM

1. Close manual air vents, drain cock, and automatic air vent, if used.
2. Fill to correct system pressure. Correct pressure will vary with each application. Residential systems are often designed for 12 pounds of cold fill pressure.
3. Open automatic air vent two turns, if used.
4. Open manual water feed valve.
5. a) Starting on the lowest floor, open air vents one at a time until water squirts out. Close vent.
b) Repeat with remaining vents.
6. Close manual water feed valve when correct boiler pressure is reached.

INSPECT BASE INSULATION

Check to make sure refractory is secure against all four sides of the base.

WARNING

If refractory material is damaged or displaced, call serviceman immediately. **DO NOT** operate boiler.

CAUTION

Ceramic fiber material used in boiler base insulation and gaskets can cause temporary skin, eye, and upper respiratory irritation.

Use NIOSH or MSHA approved protection when installing or removing this material.

TO PLACE IN OPERATION

1. Verify boiler is filled with water.
2. Connect electric power supply.
3. Open manual main shut-off valve, if used, and gas cock on gas valve.

CAUTION

Access panel must be secured in position during boiler operation to prevent momentary flame rollout on ignition of main flame, which can melt thermal fuse element.

DANGER

NEVER jumper thermal fuse or hazardous condition will exist.

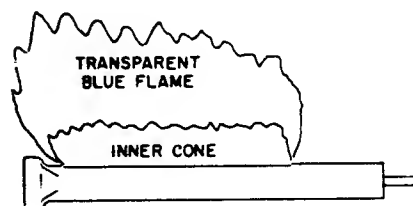
4. Move indicator on thermostat to call for heat.
5. If boiler fails to start, check for the following problems:
 - a) Loose connections or blown fuse?
 - b) High limit set below boiler water temperature?
 - c) Thermostat set below room temperature?
 - d) Gas not turned on at meter and boiler?
 - e) Incoming natural gas pressure less than 5" W.C. or propane less than 10" W.C.?
 - f) Access panel not secured in place?
 - g) If above fails to eliminate problem, refer to Control Supplement.
6. Heat to approximately 210°F for 15 minutes to drive off dissolved gases. The high limit should be set above 210°F .
7. Check system piping for leaks. If found, repair immediately. **DO NOT** use petroleum based stop-leak compounds or damage to the boiler will occur.
8. Vent air from the system. Refer to steps 4 thru 6 under "Fill the System". Air in the system can interfere with water circulation and cause improper heat distribution.

INSPECT VENTING SYSTEM

Check the gas-tight seal at all vent pipe connections.

CHECK BURNER FLAMES

1. Proper burner flame, see Figure 21. Yellow-orange streaks may appear—caused by dust.
2. Improper flame:
 - a. Overfired—Flames large.
 - b. Underfired—Flames small.
 - c. Lack of primary air—Yellow tipping on flames; soot-ing will occur.



**TYPICAL
MAIN BURNER
FLAME
FIGURE 21**

Section VIII: Check-out Procedure

CHECK-OUT PROCEDURE

Check-off steps as completed.

- ☐ 1. Boiler and heat distribution units filled with water?
- ☐ 2. Automatic air vent, if used, open two full turns during venting procedure?
- ☐ 3. Air purged from system?
- ☐ 4. Air purged from gas piping? Piping checked for leaks?
- ☐ 5. Follow operating instruction label on boiler for proper start-up. Also refer to "To Place in Operation", page 14.
- ☐ 6. Proper burner flame? Refer to "Check Burner Flames", page 14.
- ☐ 7. Test safety controls: If boiler is equipped with a low water cut-off or additional safety controls, test for operation as outlined by the manufacturer. Burners should be operating and should go off when controls are tested. When safety devices are restored, burners should reignite.
- ☐ 8. Test limit control: While burners are operating, move the indicator of the high limit control below actual boiler water temperature. The blower and burners should go off while the circulator continues to operate. Raise the limit control above the boiler water temperature and the burners should reignite.
- ☐ 9. Test ignition system safety device:
 - a. Connect voltmeter to gas valve terminals.
 - b. Turn off manual gas valve.
 - c. Set thermostat to call for heat.
 - d. Ignitor will glow for approximately 45 seconds. Near end of 45 seconds, 24VAC will show at gas valve for approximately 7 seconds and then return to 0 VAC.
 - e. To restart system, turn on gas, set thermostat back, then re-issue call for heat. Ignitor will heat up, trial for ignition occurs, and burners ignite.
- ☐ 10. High limit control set to the design temperature requirements of the system? Maximum high limit setting—220°F.
- ☐ 11. For multiple zones, flow adjusted so it is about the same in each zone?
- ☐ 12. Thermostat heat anticipator is set properly? Refer to wiring diagram on jacket door.
- ☐ 13. Boiler cycled with the thermostat? Raise to highest setting and verify boiler goes through normal start-up cycle. Lower to lowest setting and verify boiler goes off.
- ☐ 14. Measure gas input (natural gas only):
 - a. Operate boiler 10 minutes.
 - b. Turn off other appliances.
 - c. At natural gas meter, measure time (in seconds) required to use one cubic foot of gas.
 - d. Calculate gas input:

$$\frac{3600 \times 1000}{\text{number seconds from step C}} = \text{Btuh}$$
 - e. Btuh calculated should approximate input rating on rating plate.
- ☐ 15. For proper aspiration, the manifold gas pressure for natural gas should be 3½ inches water column and for propane gas should be 10 inches water column. Check manifold gas pressure by connecting a manometer to the downstream test tapping on the main gas valve.
- ☐ 16. Several operating cycles observed for proper operation?
- ☐ 17. Room thermostat set to desired room temperature?
- ☐ 18. Installation and Service Certificate on this page completed?
- ☐ 19. All instructions shipped with this boiler reviewed with owner or maintenance person, returned to envelope and given to owner or displayed near boiler?

Installation and Service Certificate

BOILER MODEL _____ SERIES _____ CP NUMBER _____ DATE INSTALLED _____

BTU INPUT _____

- ☐ Installation instructions have been followed.
- ☐ Check-out sequence has been performed.
- ☐ Above information is certified to be correct.
- ☐ Information received and left with owner/maintenance person.

Installer _____
(Company) (Address) (Phone)

(Installer's Signature)

Section IX: Maintenance

**Also Refer to Control Supplement Shipped With
Boiler for Specific Control Operation and Troubleshooting**

SUGGESTED MINIMUM MAINTENANCE SCHEDULE

Beginning of each heating season:

1. Annual service call by a qualified service agency.
2. Check burners and flueways for sooting. Use a mirror and flashlight to look up from base through sections. Call serviceman to clean, if necessary.
3. Visually inspect venting system for proper function, deterioration or leakage.
4. Visually inspect base insulation.
5. Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids.
6. Check for and remove any obstruction to the flow of combustion or ventilation air to the boiler.
7. Follow procedure "To Place in Operation".
8. Visually inspect burner flames.
9. Check operation of safety devices. Refer to manufacturer's instructions.
10. Follow instructions on circulator to oil, if oil lubricated. Overoiling will damage the circulator. Water lubricated circulators do not need oiling.
11. Visually inspect condensate drain trap and hose for proper operation or deterioration.

Periodically during heating season:

1. Check safety relief valve. Reference manufacturer's instructions on relief valve tag.
2. Test low water cut-off, if used. Blowdown if float type. Reference manufacturer's instructions.
3. Visually inspect condensate drain trap and hose for proper operation or deterioration.

Every 6 months:

1. Oil blower motor with S.A.E. oil as shown on motor.

Monthly during heating season:

1. Check for leaks in the boiler and piping. If found, repair at once. DO NOT use petroleum based stop-leak compounds—leakage between the sections will occur.
2. Visually inspect burner flames.
3. Visually inspect venting system for proper function, deterioration or leakage.
4. Check automatic air vent for leakage.

Daily during heating season:

1. Check that boiler area is free from combustible materials, gasoline and other flammable vapors and liquids.
2. Check for and remove any obstruction to the flow of combustion or ventilation air to the boiler.

End of each heating season:

1. Follow "Annual Shutdown Procedures".

CLEANING BOILER HEATING SURFACES

After each heating season, remove front access panel to inspect burners and flues. Use a mirror and flashlight to look up from base through sections. If soot is found, contact your serviceman to clean. The following cleaning procedure should only be done by a certified VHE heating contractor. Properly adjusted gas boilers seldom need flue cleaning.

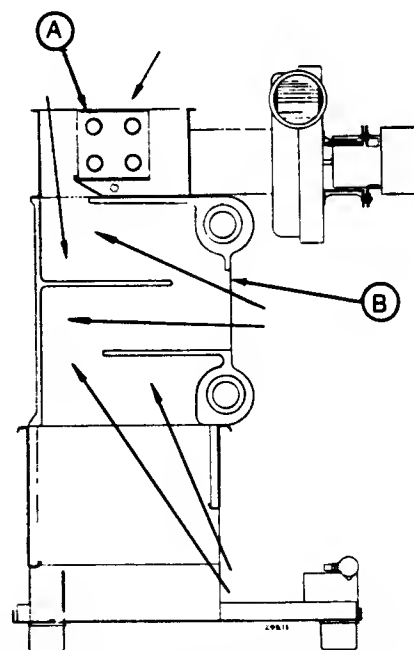
1. Shut down boiler.
2. Remove top jacket panels. Remove front and interior jacket panels.
3. Remove flue collector cover (A) and front cleanout cover (B).

CAUTION

Ceramic fiber material used in boiler base insulation and gaskets can cause temporary skin, eye, and upper respiratory irritation.

Use NIOSH or MSHA approved protection when installing or removing this material.

4. Remove burners. Vacuum or brush to remove dust and lint.
5. Thoroughly clean heating surfaces with a flue brush as illustrated.
6. Clean VHE heat exchanger with water and/or compressed air. Check drain for operation after cleaning.
7. Remove soot from boiler.



**CLEANING BOILER HEATING SURFACES
FIGURE 22**

8. Replace burners.

CAUTION

When replacing, burner tubes must be seated in the slots in the back with the openings facing up.

9. Replace flue collector cover and front cleanout cover. Re-seal with silicone sealant.
10. Replace jacket panels.
11. Start boiler following start-up procedure.

ANNUAL SHUT-DOWN PROCEDURE

1. When used, close manual main shut-off valve and gas cock on gas valve.
2. Disconnect electric power supply.
3. Move thermostat indicator to low setting.
4. DO NOT drain system unless exposure to freezing temperatures will occur. If antifreeze is used in the system, do not drain.
5. Open boiler drain cock to remove impurities that may have settled in the boiler (about a quart is all that is necessary to drain out). Refill to correct pressure.

Section X: Replacement Parts

Parts Lists

Component-Assemblies Replacement

(Also refer to Control Supplement for control replacement)

Selection Assembly	18
Base Assembly	19
Jacket Assembly	20
Flue Collector Assembly, Transition Assembly and Blower Cabinet Assembly	21
Boiler Trim Assembly	22

COMPONENT REPLACEMENT INSTRUCTIONS

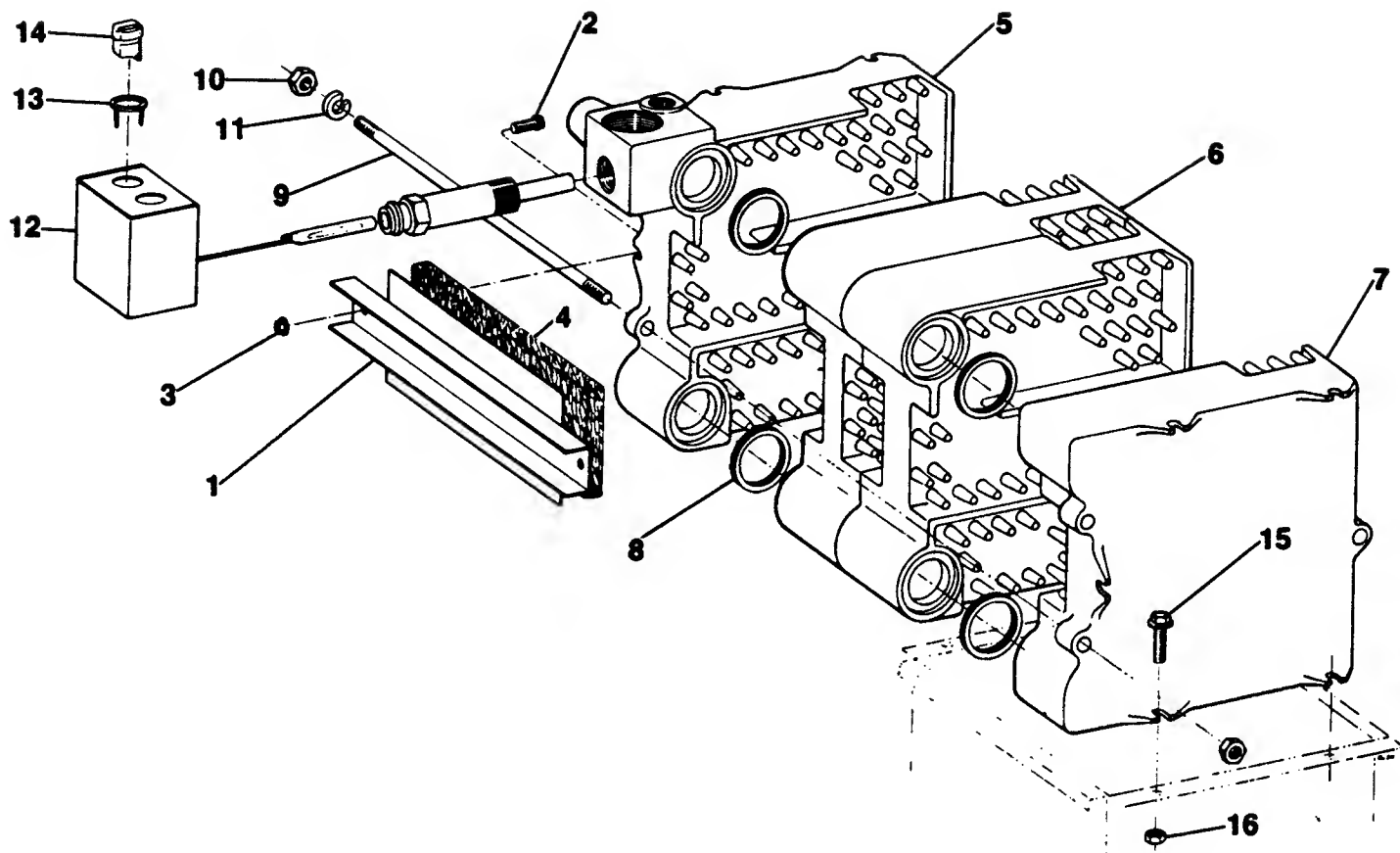
Before replacing any parts on the boiler:

1. Turn off power
2. Shut off gas supply

Refer to the appropriate exploded diagram for parts replacement.

Replacement parts can be ordered or purchased through a local Weil-McLain distributor. When ordering, specify "Model VHE (Series 3)" boiler and include description and number of replacement part. Some parts are stock items and can be purchased from a local supply house.

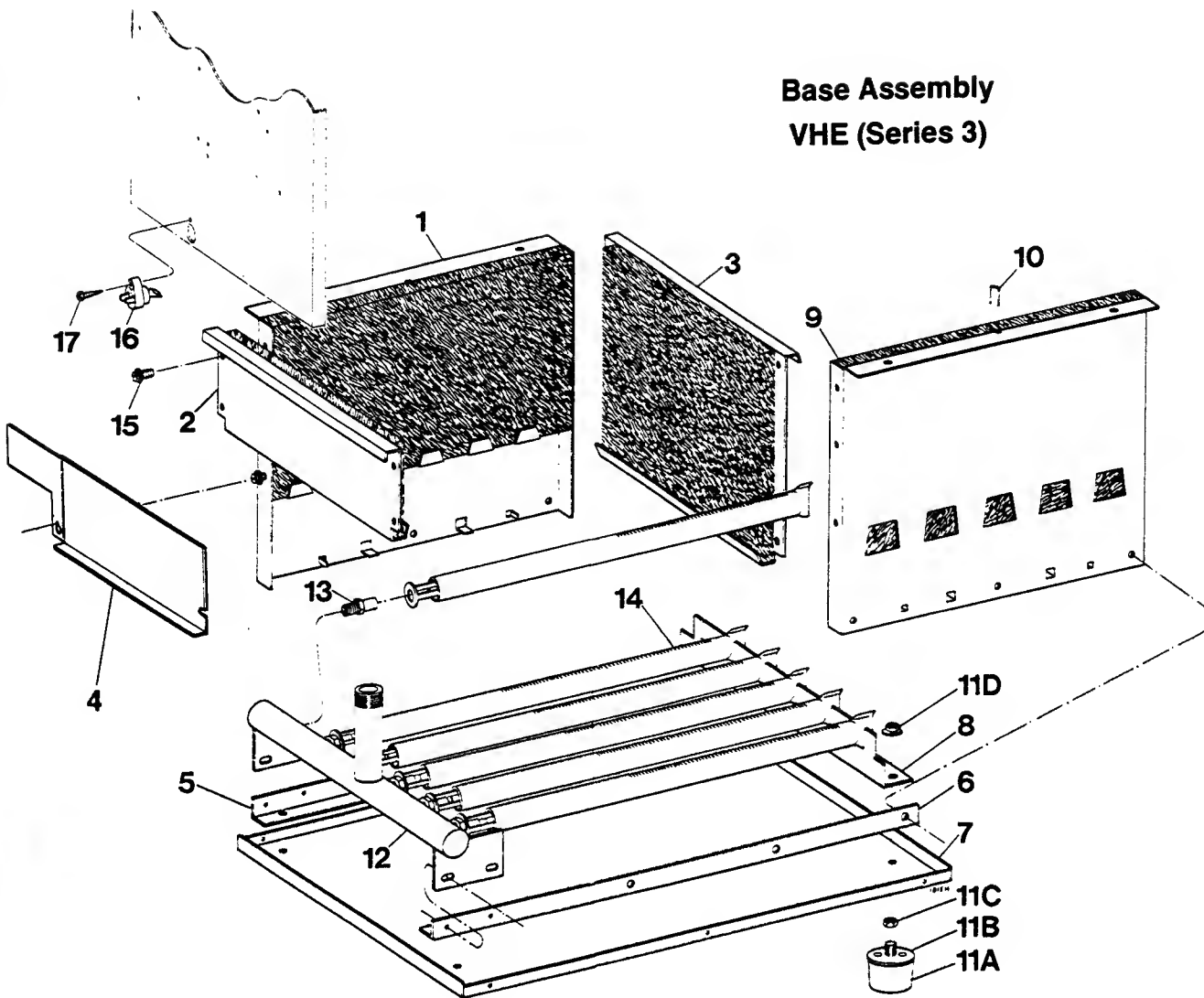
Section Assembly VHE (Series 3)



MODEL NO.		VHE 3		VHE 4		VHE 5		VHE 6	
NO.	PART DESCRIPTION	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.
1	Cleanout Plate	1	450-030-450	1	450-030-451	1	450-030-452	1	450-030-453
2	Screw, Whiz Lock 1/4"-20 x 1 1/4"	2	■	2	■	2	■	2	■
3	Nut, Whiz Lock 1/4"-20	2	■	2	■	2	■	2	■
4	Cerablanket Insulation	1	591-221-280	1	591-221-281	1	591-221-282	1	591-221-283
5	Left End Section 2914	1	312-900-000	1	312-900-000	1	312-900-000	1	312-900-000
6	Intermediate Section 2915	1	312-900-003	2	312-900-003	3	312-900-003	4	312-900-003
7	Right End Section 2918	1	312-900-006	1	312-900-006	1	312-900-006	1	312-900-006
8	Square Cut Seal 2"	4	592-800-011	6	592-800-011	8	592-800-011	10	592-800-011
9	Tie Rod	3	560-234-500	3	560-234-501	3	560-234-502	3	560-234-503
10	Nut, Hex 7/16"-14	6	■	6	■	6	■	6	■
11	Washer, Helical Spring Lock 7/16"	3	■	3	■	3	■	3	■
12	High Limit Control w/Well and Stop at 220°	1	510-312-010	1	510-312-010	1	510-312-010	1	510-312-010
13	Strain Relief Adapter	1	■	1	■	1	■	1	■
14	Strain Relief Bushing	1	■	1	■	1	■	1	■
15	Screw, Whiz Lock 5/16"-18 x 1"	4	■	4	■	4	■	4	■
16	Nut, Two Way Lock 5/16"-18	4	■	4	■	4	■	4	■

■ Standard hardware item, purchase locally.

Base Assembly VHE (Series 3)



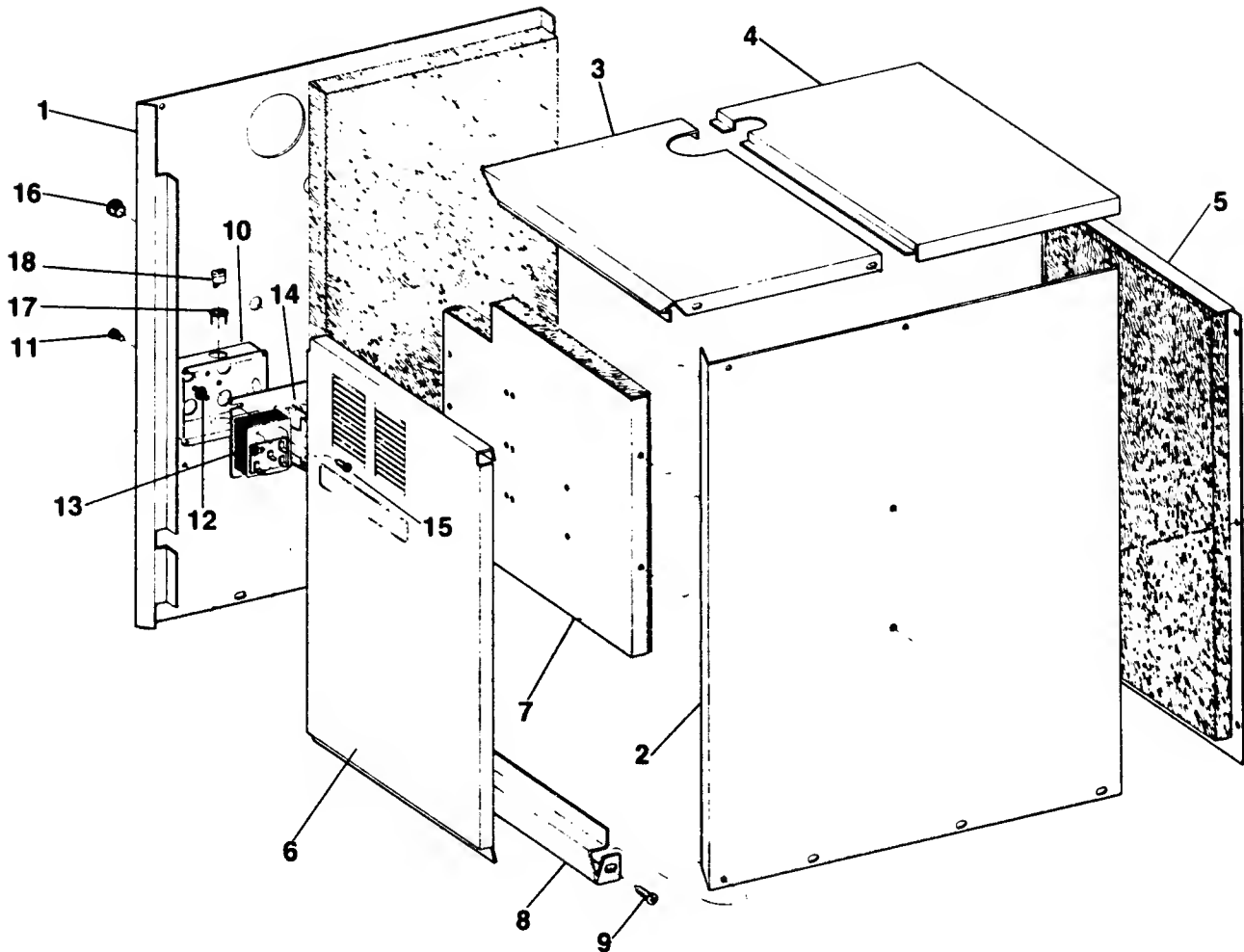
MODEL NO.		VHE 3		VHE 4		VHE 5		VHE 6	
NO.	PART DESCRIPTION	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.
1	Base Side Panel	2	460-003-710	2	460-003-710	2	460-003-710	2	460-003-710
2	Base Front Cross Tie	1	450-030-458	1	450-030-459	1	450-030-460	1	450-030-461
3	Base Back Cross Tie	1	450-030-462	1	450-030-463	1	450-030-464	1	450-030-465
4	Base Access Panel	1	450-030-644	1	450-030-645	1	450-030-646	1	450-030-647
5	Base Pan Angle—Left Hand	1	450-030-475	1	450-030-475	1	450-030-475	1	450-030-475
6	Base Pan Angle—Right Hand	1	450-030-474	1	450-030-474	1	450-030-474	1	450-030-474
7	Base Pan	1	450-030-454	1	450-030-455	1	450-030-456	1	450-030-457
8	Burner Rest	1	450-030-466	1	450-030-467	1	450-030-468	1	450-030-469
9	Base Insulation Set	1	591-222-070	1	591-222-071	1	591-222-072	1	591-222-073
10	Staple 1 $\frac{3}{4}$ " for base insulation	2	541-300-000	2	541-300-000	2	541-300-000	2	541-300-000
11	Leg, Screws on Assembly*	4	590-424-252	4	590-424-252	4	590-424-252	4	590-424-252
11a	Leg	4	—	4	—	4	—	4	—
11b	Washer, with $\frac{3}{8}$ " hole	4	—	4	—	4	—	4	—
11c	Nut, $\frac{5}{16}$ "—18 Jam	4	—	4	—	4	—	4	—
11d	Nut, $\frac{5}{16}$ "—18 Whiz Lock Plated	4	—	4	—	4	—	4	—
	Screw, Machine Flat Head Phillips $\frac{5}{16}$ "—18 x 2 $\frac{1}{4}$ "	4	—	4	—	4	—	4	—
12	Manifold	1	591-126-560	1	591-126-561	1	591-126-562	1	591-126-563
13	Orifice, Main Burner								
	Natural—#47	4	560-528-992	6	560-528-992	8	560-528-992	10	560-528-992
	Propane—#56	4	560-528-990	6	560-528-990	8	560-528-990	10	560-528-990
14	Burner, Steel	4	512-200-035	6	512-200-035	8	512-200-035	10	512-200-035
15	Screw, STP Type D Hex Wash Head Slot 10-32 x $\frac{3}{8}$ "	20	■	20	■	20	■	20	■
16	Thermal Fuse Element	1	512-050-230	1	512-050-230	1	512-050-230	1	512-050-230
17	Screw Philips, 8 x $\frac{3}{4}$ Pan Hd.-A.	1	■	1	■	1	■	1	■

■ Standard hardware item, purchase locally.

* Sold as assembly only.

— Part of assembly.

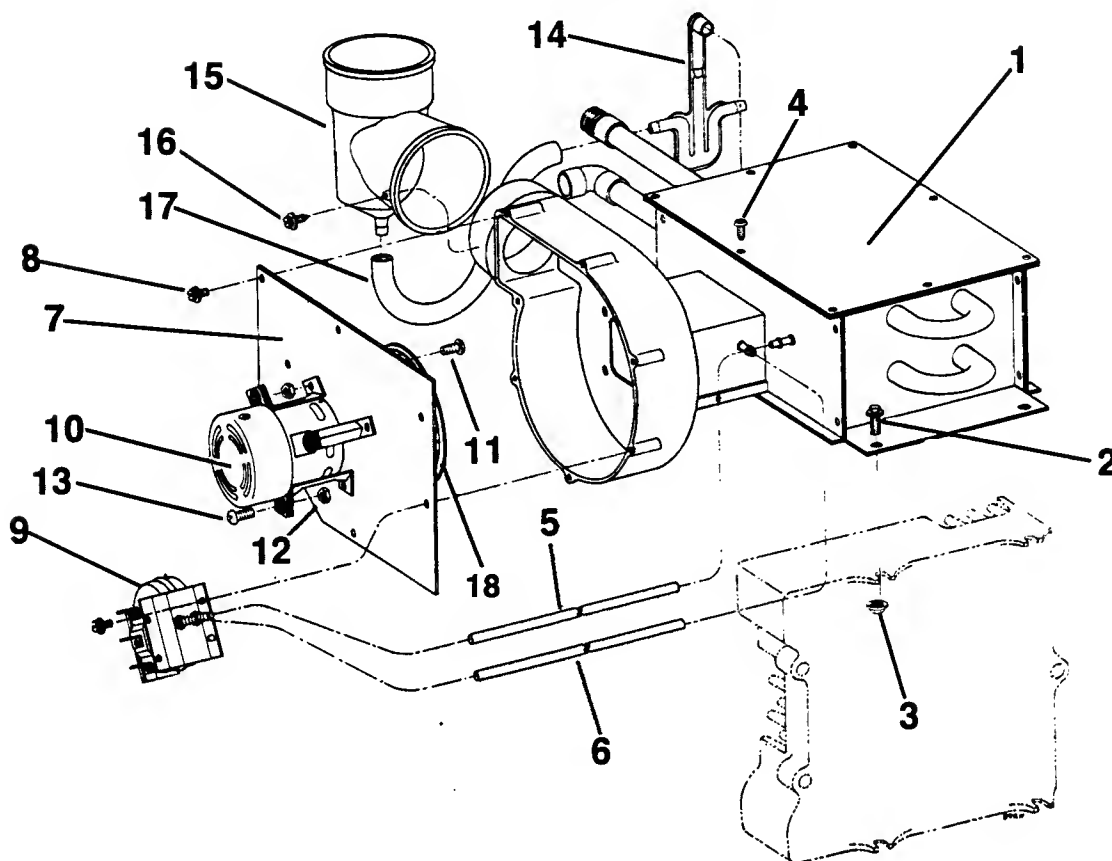
Jacket Assembly VHE (Series 3)



MODEL NO.		VHE 3		VHE 4		VHE 5		VHE 6	
NO.	PART DESCRIPTION	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.
1	Jacket, Left Hand Side Panel	1	422-901-165	1	422-901-165	1	422-901-165	1	422-901-165
2	Jacket, Right Hand Side Panel	1	422-901-160	1	422-901-160	1	422-901-160	1	422-901-160
3	Jacket, Front Top Panel	1	422-901-100	1	422-901-101	1	422-901-102	1	422-901-103
4	Jacket, Rear Top Panel	1	422-901-110	1	422-901-111	1	422-901-112	1	422-901-113
5	Jacket, Rear Panel	1	422-901-120	1	422-901-121	1	422-901-122	1	422-901-123
6	Jacket Door	1	422-901-130	1	422-901-131	1	422-901-132	1	422-901-133
7	Jacket, Interior Panel	1	422-901-140	1	422-901-141	1	422-901-142	1	422-901-143
8	Jacket, Front Bottom Cross Tie	1	422-901-150	1	422-901-151	1	422-901-152	1	422-901-153
9	Screw, Sheet Metal Pan-A Phil #10 x 1/2"	24	■	24	■	24	■	24	■
10	Junction Box 4" x 4" x 1 1/2"	1	■	1	■	1	■	1	■
11	Screw, Machine Pan Head Phillips 10-32 x 1/2"	1	■	1	■	1	■	1	■
12	Nut, Hex Green Plated 10-32	1	■	1	■	1	■	1	■
13	Transformer w/Plug In Receptacle and Bale Wire	1	510-312-165	1	510-312-165	1	510-312-165	1	510-312-165
14	Relay	1	510-350-223	1	510-350-223	1	510-350-223	1	510-350-223
15	Screw, Sheet Metal Pan-AB Phil #8 x 1/2"	2	■	2	■	2	■	2	■
16	Bushing, Thermostat Wire	1	■	1	■	1	■	1	■
17	Strain Relief Adapter	1	■	1	■	1	■	1	■
18	Strain Relief Bushing	1	■	1	■	1	■	1	■

■ Standard hardware item, purchase locally.

Flue Collector Assembly, Transition Assembly and Blower Cabinet Assembly VHE (Series 3)

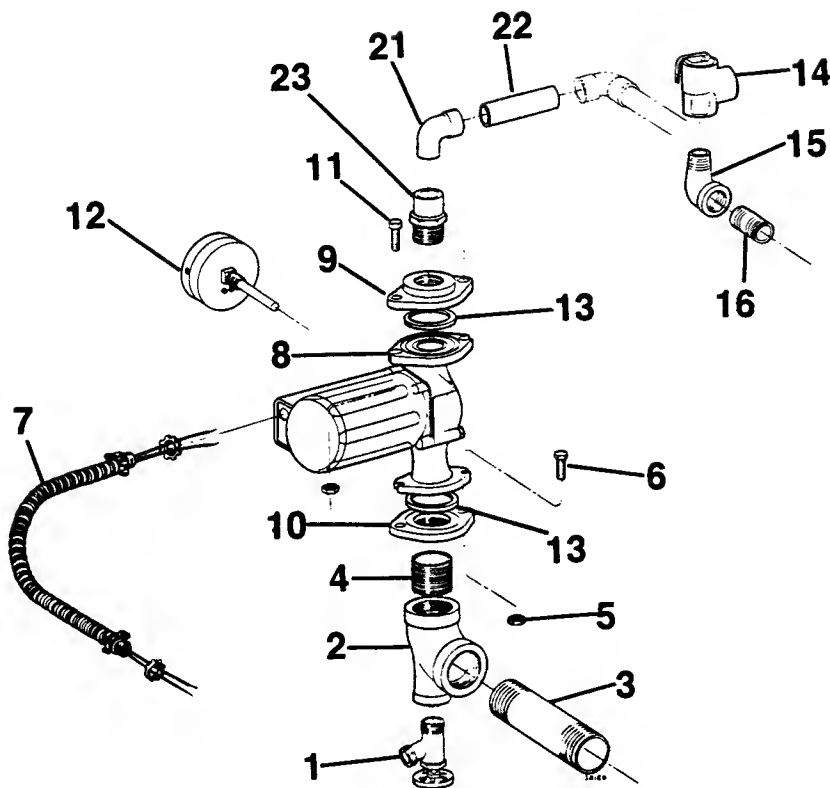


MODEL NO.		VHE 3		VHE 4		VHE 5		VHE 6	
NO.	PART DESCRIPTION	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.
1	Flue Collector Replacement Assembly* (flue collector, transition and blower housing)	1	450-030-396	1	450-030-397	1	450-030-398	1	450-030-399
2	Screw, Whiz Lock 1/4"-20 x 1 1/4" (For Flue Collector Assembly to Sections)	4	■	4	■	4	■	4	■
3	Nut, Whiz Lock 1/4"-20 (For Flue Collector Assembly to Sections)	4	■	4	■	4	■	4	■
4	Screw, Sheet Metal Type A Pan Head Phillips No. 10 x 1/2" (For Flue Collector Top Panel)	6	■	8	■	8	■	10	■
5	Tubing, Silicone 1/8" ID x 12", White	1	590-317-630	1	590-317-630	1	590-317-630	1	590-317-630
6	Tubing, Silicone 1/8" ID x 12", Red	1	590-317-631	1	590-317-631	1	590-317-631	1	590-317-631
7	Blower Cabinet Assembly (blower wheel, cover plate, blower motor, motor mounting brackets, shock mounts, nuts and bolts)*	1	510-312-315	1	510-312-315	1	510-312-315	1	510-312-315
8	Screw, STP Type D Hex Wide Head SLT, No. 10-32 x 3/8" (For Blower Housing Cover Plate and Pressure Switch)	7	■	7	■	7	■	7	■
9	Pressure Switch▲	1	511-624-514	1	511-624-514	1	511-624-514	1	511-624-514
10	Replacement Motor Kit (motor, shock mounts)*	1	382-930-225	1	382-930-225	1	382-930-225	1	382-930-225
11	Round Head Phillips Mach. Screw 10-32 x 3/8 SS	3	■	3	■	3	■	3	■
12	10-32 Hex 2-way Lock Nut	6	■	6	■	6	■	6	■
13	Round Head Phillips Mach. Screw 10-32 x 3/4 ZP	3	■	3	■	3	■	3	■
14	Drain Trap, plastic 1/2" dual	1	562-302-546	1	562-302-546	1	562-302-546	1	562-302-546
15	3" Plastic Vent Ell w/hose fittings	1	562-907-576	1	562-907-576	1	562-907-576	1	562-907-576
16	Screw, Hex Wash Hd/Slot 10 x 1/2 SS	1	■	1	■	1	■	1	■
17	Drain hose	1	590-317-633	1	590-317-633	1	590-317-633	1	590-317-633
18	Blower wheel	1	510-312-279	1	510-312-279	1	510-312-279	1	510-312-279

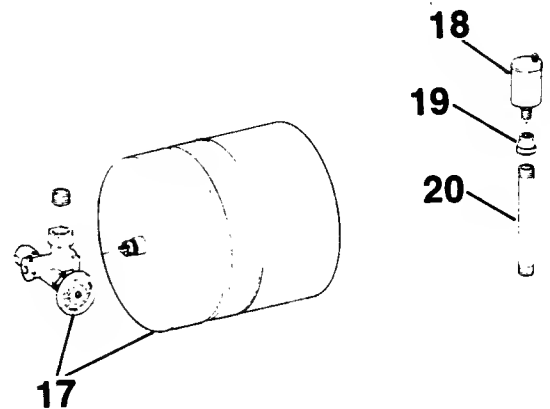
■ Standard hardware item, purchase locally.

* Sold as assembly only.

▲ For a high altitude pressure switch part number, see high altitude label on boiler.



Boiler Trim Assembly VHE (Series 3)



MODEL NO.		VHE 3		VHE 4		VHE 5		VHE 6	
NO.	PART DESCRIPTION	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.	QTY.	PART NO.
1	Drain Valve 3/4"	1	■	1	■	1	■	1	■
2	Tee reducer black 1 1/4 x 3/4 x 1 1/4	1	■	1	■	1	■	1	■
3	Nipple 1 1/4" x 5"	1	■	1	■	1	■	1	■
4	Nipple, Close 1 1/4"	1	■	1	■	1	■	1	■
5	Nut, Hex 7/16"-14	4	■	4	■	4	■	4	■
6	Screw, Hex Head 7/16"-14 x 1 1/4"—SMALL PUMPS	2	■	2	■	2	■	2	■
	Screw, Hex Head 7/16"-14 x 1 1/2"—LARGE PUMPS	2	■	2	■	2	■	2	■
7	Wiring Harness, Box to Pump	1	■	1	■	1	■	1	■
8	Circulator B&G LR-20*—SMALL	1	511-405-112	*	511-405-112	*	511-405-112	*	511-405-112
	Circulator TACO 007*—SMALL	1	511-405-113	*	511-405-113	*	511-405-113	*	511-405-113
***	Circulator Pump B&G**—LARGE	1	511-405-115	1	511-405-115	1	511-405-115	1	511-405-115
	Circulator Pump TACO**—LARGE	1	511-405-116	1	511-405-116	1	511-405-116	1	511-405-116
9	Pump Flange 1" B&G	1	563-910-010	1	563-910-010	1	563-910-010	1	563-910-010
	Pump Flange 1" TACO	1	563-910-011	1	563-910-011	1	563-910-011	1	563-910-011
10	Pump Flange 1 1/4" B&G	1	563-910-012	1	563-910-012	1	563-910-012	1	563-910-012
	Pump Flange 1 1/4" TACO	1	563-910-013	1	563-910-013	1	563-910-013	1	563-910-013
11	Screw, Hex Head 7/16"-14 x 1 1/2"—LARGE PUMPS	2	■	2	■	2	■	2	■
	Screw, Hex Head 7/16"-14 x 1 1/4"—SMALL PUMPS	2	■	2	■	2	■	2	■
12	Pressure-Temperature Gauge	1	510-218-099	1	510-218-099	1	510-218-099	1	510-218-099
13	Gasket TACO—SMALL & LARGE PUMPS	2	590-317-543	2	590-317-543	2	590-317-543	2	590-317-543
	Gasket B&G LR-20	2	590-317-541	2	590-317-541	2	590-317-541	2	590-317-541
	Gasket B&G—100	2	590-317-542	2	590-317-542	2	590-317-542	2	590-317-542
14	Relief Valve Female 30#	1	■	1	■	1	■	1	■
15	Street El, 3/4" Black for Female Valve	1	■	1	■	1	■	1	■
16	Nipple, 3/4" x 2" Black	1	■	1	■	1	■	1	■
17	Fill-Trol System #109 (P-VHE 3 thru 5 only)	1	510-632-086	1	510-632-086	1	510-632-086		
	Fill-Trol System #110 (P-VHE 6 only)							1	510-632-087
18	Auto Air Vent (P-VHE only)	1	510-148-562	1	510-148-562	1	510-148-562	1	510-148-562
19	Reducer 1/2" NPT x 1/4" NPT (P-VHE only)	1	■	1	■	1	■	1	■
20	Nipple 1/2" x 6" (P-VHE only)	1	■	1	■	1	■	1	■
21	Street El, 1" Nom Copper Close Ruff	1	■	1	■	1	■	1	■
22	Tube, 1" Nom Copper X 3 1/4"	1	■	1	■	1	■	1	■
23	Adapter, 1" NPT	1	■	1	■	1	■	1	■
***	Silicone Sealant (400°F—Dow 732 RTV or equivalent)	1	■	1	■	1	■	1	■
***	Retort Cement	1	■	1	■	1	■	1	■

■ Standard hardware item, purchase locally.

** Interchangeable parts.

* Interchangeable parts.

*** Not shown on drawing.

RATINGS



DOE



VHE BOILER (Series 3)

Water Boiler Number	A.G.A. Input BTU/Hr.*	DOE Heating Capacity BTU/Hr.†	Net I-B-R Ratings-Water BTU/Hr.**	DOE Seasonal Efficiency AFUE	304 Stainless Steel Vent Dia.	Boiler Water Content (Gal.) (Includes heat exchanger and pump)
■VHE-3	67,000	59,000	51,300	87.0	3"	1.8
■VHE-4	100,000	87,000	75,700	87.1	3"	2.4
■VHE-5	133,000	117,000	101,700	87.3	3"	3.0
■VHE-6	167,000	147,000	127,800	87.4	3"	3.6

*For elevations above 2,000 ft. AGA ratings must be reduced. Contact Well-McLain representative or distributor for details.

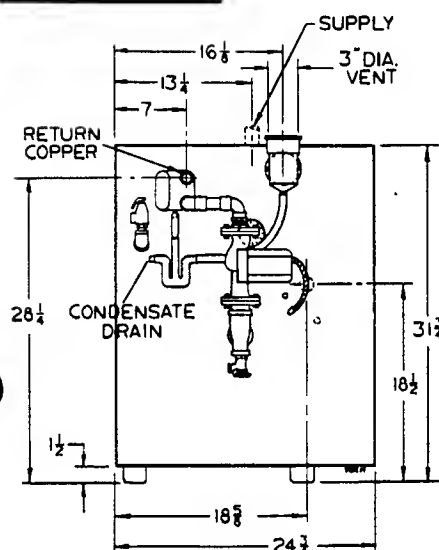
†Based on standard test procedures prescribed by the United States Department of Energy.

**Net I-B-R ratings are based on net installed radiation of sufficient quantity for the requirements of the building and nothing need be added for normal piping and pick-up. Ratings are based on a piping and pick-up allowance of 1.15. An additional allowance should be made for unusual piping and pick-up loads.

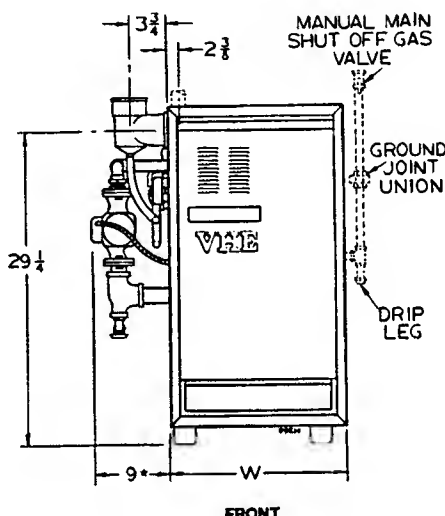
■Add "P-" to designator for boiler with Fill-Trol system (Example P-VHE-3).

Boilers tested for 50 PSI working pressure.
VHE boilers not available for millivolt systems.

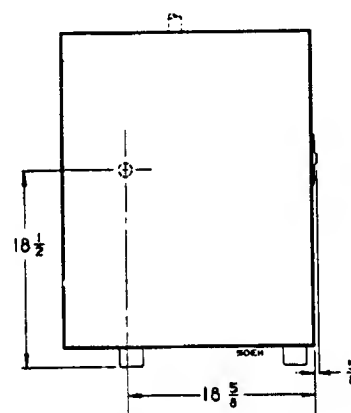
DIMENSIONS



LEFT END



FRONT



RIGHT END

*With Fill-Trol tank, add 4 1/4" (P-VHE-6 only).

Water Boiler Number	Supply	Copper VHE Return	Boiler Width W	Gas Connection Size	Crate Dimensions (outside measurements—In.)			Approx. Shipping Wt.—Lbs.	
					Length	Width	Height	VHE	P-VHE
VHE-3	1 1/4" N.P.T.	1" N.P.T.	11 1/4"	1/2"	28	28	35	217	242
VHE-4	1 1/4" N.P.T.	1" N.P.T.	14 1/4"	1/2"	28	28	35	268	293
VHE-5	1 1/4" N.P.T.	1" N.P.T.	17 1/4"	1/2"	28	34	35	319	335
VHE-6	1 1/4" N.P.T.	1" N.P.T.	20 1/4"	1/2"	28	34	35	370	387

Gas piping from meter to be sized according to local utility requirements.

STANDARD EQUIPMENT

Insulated Steel Jacket
Stainless Steel Flue Gas collector Assembly with Close-off
Stainless Steel Heat Extractor
Blower and Motor Assembly
Aluminized Steel Burners
Combination Step-Opening Gas Control Valve (Includes main valve, redundant valve, pressure regulator, pilot filter, and manual main shutoff valve) for 24 Volt
Hot Surface Ignition System
Pressure Switch
Thermal Fuse Element
Electrical Junction Box
Combination Relay Receptacle and 40 VA Transformer
Plug-In Circulator Relay
High-Limit Temperature Control
Circulator—1-Inch, All Sizes

3-Inch High-Temperature Plastic Vent Ell, Dual Condensate Drain Trap, and Connecting Hose
Silastic Sealant
Built-In Air Eliminator
30 PSI ASME Safety Relief Valve
Combination Pressure-Temperature Gauge
Drain Valve
Fill-Trol System (compression tank, fill and check valve, automatic air vent, and fittings—#109 Sizes 3 through 5; #110 Size 6) for P-VHE Only

ADDITIONAL EQUIPMENT

Well-McLain DWS Domestic Water Heating System (Includes heat exchanger and circulator/adaptor)